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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/720,597

11/24/2003

Yiliang Wu

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PATENT DOCUMENTATION CENTER

XEROX CORPORATION

100 CLINTON AVE., SOUTH, XEROX SQUARE, 20TH FLOOR  
ROCHESTER, NY 14644

EXAMINER

SMOOT, STEPHEN W

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/720,597	Applicant(s) WU ET AL.	
	Examiner Stephen W. Smoot	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11-24-03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

This Office action is in response to application papers filed on 24 November 2003.

### ***Specification***

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Thin Film Transistor with a Semiconductor Layer that Includes a Gelable Self-Organizable Polymer.

2. The abstract of the disclosure is objected to because abstracts are generally limited to a single paragraph. Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities:

On page 7, first full sentence, update to indicate that 10/042,356 is now US 6,621,099, that 10/042,358 is now US 6,770,904, and that 10/042,342 has been published as 2003/0160234; and

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In Table 1 on page 17, the mobility range corresponding to the Example appears to be in error and should be changed from "0.076-0.012" to --0.076-0.12--.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-3, 5-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Koezuka et al. (US 5,107,308).

Referring to Fig. 3 and column 3, line 50 to column 5, line 46, Koezuka et al. disclose a field effect transistor with the following features:

- A semiconductor layer (41) in contact with an insulating film (3);
- A gate (2) in contact with the insulating film (3);
- A source (9) and a drain (10) both in contact with the semiconductor layer (41);

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- The semiconductor layer (41) is a conjugated polymer and, more specifically, can be polythiophene;
- In an example, the source electrode (9) is 4200 angstroms (i.e. 420 nm) thick and a polythiophene semiconductor layer (41) is 850 angstroms (i.e. 85 nm) thick (also see column 7, line 30 to column 8, line 58); and
- The insulating film (3) can be an inorganic material (e.g. silicon dioxide) or an organic polymer (e.g. polyethylene).

These are all of the structural limitations set forth in claims 1-3, 8-11 of the applicant's invention. Regarding the capable of gelling limitation of claim 1 and the limitations of claims 6-7, these are property limitations that are presumed to be inherent to the field effect transistor of Koezuka et al. because its structure is substantially identical to the applicant's structure as claimed in claims 1-3, 5-14. Per MPEP section 2112.01, a *prima facie* case of anticipation has been established and the burden shifts to the applicant to show that the structures are not identical. Regarding the limitations of claims 5, 12-14, these are product-by-process limitations that are directed to the method of production, itself, and do not appear to be structurally distinguishable from the prior art of Koezuka et al. Per MPEP section 2113, the burden shifts to the applicant to show an unobvious difference between their product as claimed in claims 5, 12-14 and the field effect transistor of Koezuka et al.

6. Claims 1-7, 10-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsumura et al. (US 5,500,537).

Referring to Fig. 4 and column 7, line 36 to column 8, line 30, Tsumura et al. disclose a field effect transistor with the following features:

- A semiconductor film (8) in contact with an insulating film (3);
- A gate electrode (2) in contact with the insulating film (3);
- A source electrode (4) and a drain electrode (5) both in contact with the semiconductor layer (8);
- The semiconductor layer (8) is a conjugated block copolymer and, more specifically, can include blocks of polythiophene; and
- The insulating film (3) can be an inorganic material (e.g. silicon dioxide) or an organic polymer (e.g. polyethylene) (also see column 3, lines 51-62).

These are all of the structural limitations set forth in claims 1-4, 10-11 of the applicant's invention. Regarding the capable of gelling limitation of claim 1 and the limitations of claims 6-7, these are property limitations that are presumed to be inherent to the field effect transistor of Tsumura et al. because its structure is substantially identical to the applicant's structure as claimed in claims 1-7, 10-14. Per MPEP section 2112.01, a *prima facie* case of anticipation has been established and the burden shifts to the applicant to show that the structures are not identical. Regarding the limitations of claims 5, 12-14, these are product-by-process limitations that are directed to the method of production, itself, and do not appear to be structurally distinguishable from the prior art of Tsumura et al. Per MPEP section 2113, the burden shifts to the applicant to show an unobvious difference between their product as claimed in claims 5, 12-14 and the field effect transistor of Tsumura et al.

7. Claims 1-3, 5-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Ong et al. (US 6,770,904 B2).

Referring to Fig. 1 and column 17, line 45 to column 19, line 42, Ong et al. (US 6,770,904 B2) disclose a thin film transistor with the following features:

- A semiconductor layer (12) in contact with an insulating dielectric layer (14);
- A gate electrode (18) in contact with the insulating dielectric layer (14);
- A source electrode (20) and a drain electrode (22) both in contact with the semiconductor layer (12);
- The semiconductor layer (12) is a polythiophene polymer and, more specifically, can be formula (II-c) (see the top of column 5), which is the same as formula (9) from applicant's claim 15;
- For formula (II-c), n can range from 50 to about 3000 (also see column 16, lines 35-38);
- The source electrode (20) has a thickness that ranges from 40 nm to about 1 micrometer;
- The polythiophene semiconductor layer (12) has a thickness that ranges from 10 nm to about 1 micrometer; and
- The insulating dielectric layer (14) can be an inorganic material (e.g. silicon oxide) or an organic polymer (e.g. polyimide).

These are all of the structural limitations set forth in claims 1-3, 8-11, 15 of the applicant's invention. Regarding the capable of gelling limitation of claim 1 and the

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limitations of claims 6-7, these are property limitations that are presumed to be inherent to the thin film transistor of Ong et al. (US 6,770,904 B2) because its structure is substantially identical to the applicant's structure as claimed in claims 1-3, 5-14. Per MPEP section 2112.01, a *prima facie* case of anticipation has been established and the burden shifts to the applicant to show that the structures are not identical. Regarding the limitations of claims 5, 12-14, these are product-by-process limitations that are directed to the method of production, itself, and do not appear to be structurally distinguishable from the prior art of Ong et al. (US 6,770,904 B2). Per MPEP section 2113, the burden shifts to the applicant to show an unobvious difference between their product as claimed in claims 5, 12-14 and the thin film transistor of Ong et al. (US 6,770,904 B2).

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kishimoto et al., Aratani et al., Tanaka et al., Shi et al., Dimitrakopoulos et al., and Bao et al. teach thin film transistor structures that can include polythiophene as an organic semiconductor layer.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS

*Stephen W. Smoot*  
Patent Examiner  
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